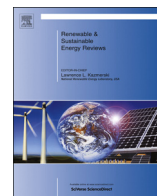




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# Renewable and Sustainable Energy Reviews

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## Biodiesel from the perspective of Turkey: Past, present and future

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### ABSTRACT

Energy is an indispensable factor of today's developed and developing societies. However, supplying most of the energy need through nonrenewable fossil fuels has come to the threatening position for both the energy demand and the sustainable development in the future. For this reason, most of the developed countries have started to reduce the foreign dependency in order to stabilize their economies and head towards more environmental and renewable resources. Particularly, economic fluctuation and environmental damages depending on the oil need which increases day by day raise the importance of biofuels. Biodiesel developed as an alternative of diesel fuel has reached up to 17.6 billion liters of production amounts over the last 20 years. It is predicted that this increase would be much more rapid in the next decade and reach up to 42 billion liters. EU, Argentina, Brazil, Malaysia and the USA supply the 93% of the biodiesel production of the world. Turkey, which is 78% foreign-dependent in terms of energy and imports its 93% of oil need, supported biodiesel production in 2000s in order to close its current deficit and prevent oil's environmental damages. However, the desired aims could not be achieved and many biodiesel facilities were shut down. Along with the amendments in the legislation of petroleum products by the end of 2011, it is aimed that the biodiesel sector would be boosted through arousing interest in biodiesel again.

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### 1. Introduction

While the world population by years has been increasing with an average of 1.45%, this accrual is about 70 million per year. Though this amount is to be underestimated for it is 0.001 percentage of the world population of 7 billion, it does not change the reality that the needs of the people which is about the population of Turkey have to be fulfilled.

As it is a necessity to enhance and increase the technology in order to satisfy these personal needs, there definitely appears an obligation to provide the energy the system demands. When it comes to the year of 2030, it is expected that the world population would reach about 8.5 billion people [1,2]. While the consumption of energy for per person was an average of 1.5 tons of oil equivalent (toe) in 1990, this amount became 1.7 toe with the increase of technology and population in 2000. The development of every part of the energy resources depends on the utility of that resource.

When the world's total carbon dioxide (CO<sub>2</sub>) emission production was analyzed; it reached 33158.4 million tons by increasing at

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the ratio of 282.3% in energy consumption in a period of 45 years [3,4]. When considered that the CO<sub>2</sub> gas can remain in the atmosphere without undergoing a change, it is understood that how much these values have great risks for the future. When the CO<sub>2</sub> oscillation on sectoral basis, 41% of the energy production is caused from power generation and heating, 23% of it is caused from vehicles and transport, 20% of it is caused from industrial treatments, 6% of it is caused from residential areas and 10% of it is caused from other areas of usage [5–7]. The emission values occurring as a result of energy use and increasing day after day cause some unfavorable results in terms of climate and health and reach the conditions that can endanger the existence of future generations in the world [5,8–14,15].

While environmental and renewable energy resources have importance for developing countries like Turkey which imports vast amounts of fuel for use of energy and also aims sustainable growth, they also give different opportunities. In this study, biofuels which is among the renewable resources will be examined. The potential of biodiesel in Turkey and in the world; production of raw material today, its quantity, its economy and its effect on agricultural policies are to be searched.

## 2. Energy policies in the world

While energy requirement increase incrementally along with rapid increase in population and industrialization, fossil fuels such as coal, gas and oil have recently caused significant problems in terms of pollution and besides they have been running low rapidly for they are exhaustible resources. Accordingly, studies on reusable and consistent energy resources which is supposed unlimited practically are becoming the government policy and sizable investments are done.

As it is seen in Fig. 1, which shows the world's energy production, the highest proportion belongs to the oil. While coal production was done almost twofold of the other energy resources in 1990s, it caught the oil production with the 3499 million tons of oil equivalent (Mtoe) amount in 2010; as for the gas production, it reached the amounts close to the oil production with an increase of 180% over the last two decades. According to Fig. 1, while opening new oil wells and new fields and the increase in production no longer look possible especially in oil production, it is clear that a tendency is shown to nonrenewable energy resources [16,17]. It is estimated that oil production is to decrease from

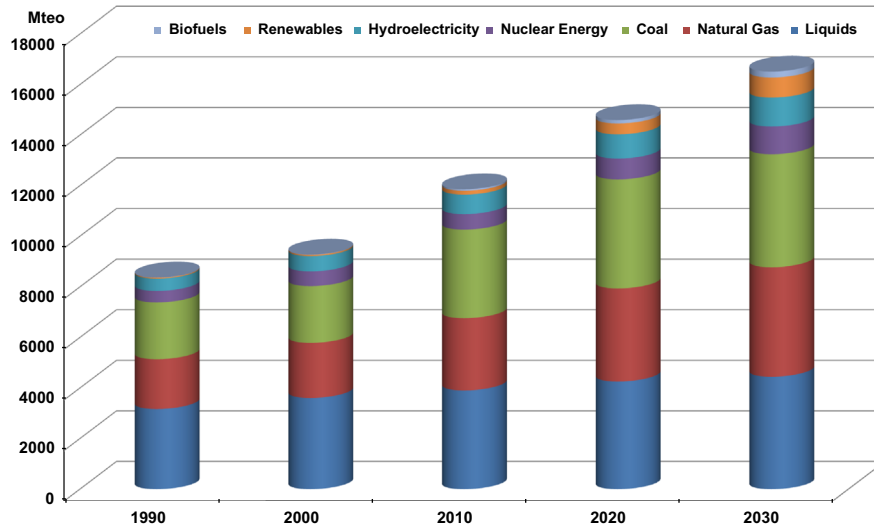


Fig. 1. World energy production [16,18].

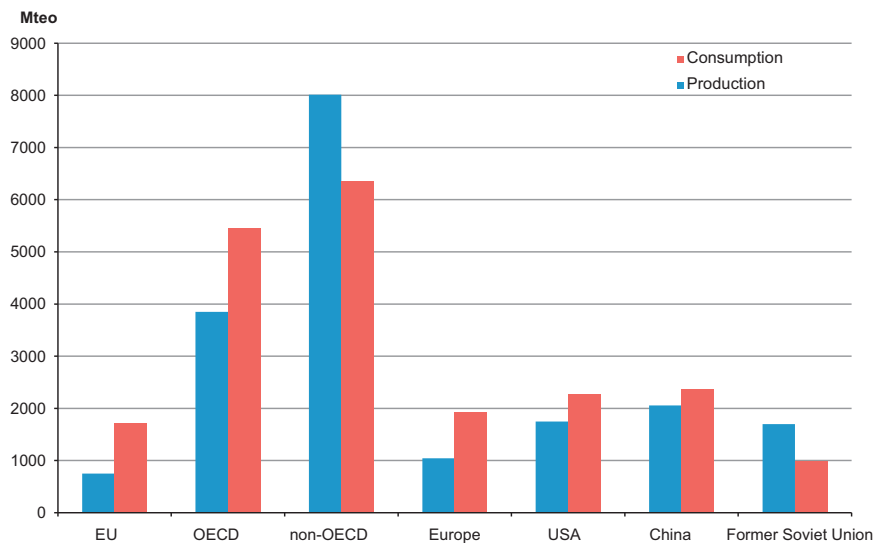


Fig. 2. Energy production and consumption values of the country and by region [8,18].

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